



Improving the Complex Treatment of Deforming Arthrosis of the Temporomandibular Joints

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Received 2nd Aug 2023,
Accepted 19th Sep 2023,
Online 19th Oct 2023

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Abstract: The present paper aims at the comparative analysis of the results of the earlier work with the use of the methods for the treatment of arthrosis of temporomandibular joint (TMJ). A method for the combined treatment of post infectious arthrosis of TMJ is proposed based on transcranial electrostimulation (TES-therapy). In order to substantiate the clinical application of this method, we performed computed tomography of TMJ and measured cytokine levels (IL-1, IL-6, IL-10 and β -endorphin) in blood serum of 40 patients presenting with post infectious arthrosis of TMJ. The results were compared with the outcome of the treatment of this disease using traditional methods. It is concluded that the proposed approach to the combined treatment of post infectious arthrosis has more pronounced beneficial effect compared with the methods previously used for the same purpose.

Key words: arthrosis, temporomandibular joint, cytokines, treatment of postinfectious arthrosis of temporomandibular joints.

INTRODUCTION

The temporomandibular joint is the main component of the articulation system, which includes the joint itself, the upper and lower jaws; muscles that determine the movements of the lower jaw; hyoid bone and dentition (101). The TMJ is a unique structure, since it is closely related to the structure and condition of the dent facial apparatus, which is especially clearly seen at different stages of ontogenesis (7). It is also necessary to take into account the fact that when the TMJ is damaged, pronounced disturbances occur not only in the dental system, but also in the musculoskeletal system as a whole (2, 9, 11).

Treatment of arthrosis of the temporomandibular joints (TMJ) is one of the problems in orthopedic dentistry. This pathology accounts for 60–70% of all joint diseases (8). Currently, treatment of TMJ arthrosis is carried out in various directions.

Some clinicians (6, 7) consider orthopedic treatment as the main pathogenetic method of treating arthrosis of the TMJ, since it is aimed at normalizing the position of the lower jaw, eliminating deformation of the occlusal surface of the dentition and premature occlusal contacts, restoring partial

or complete defects in the dentition, and restructuring the bite. Other authors (1, 2) believe that treatment of TMJ arthrosis cannot be limited or focused only on eliminating occlusal predisposing factors. It is necessary to improve joint function, stimulate metabolic processes in cartilage and bone tissue, normalize intraosseous and regional blood flow, and eliminate pain.

Currently, local therapy with glucocorticosteroids is widely used (3). Unfortunately, after their use, 15% of patients experienced a relapse of the disease quite quickly, after 2-3 months (5). The use of chondroprotectors is also known, aimed at preventing degeneration of cartilage and subchondral bone (4). In the treatment of arthrosis of the TMJ, physiotherapeutic methods were prescribed locally. However, physiotherapy did not always produce the expected results. For the treatment of deforming arthrosis of the TMJ (6), drug and physiotherapeutic treatment has been proposed. But at the same time, an allergic reaction to medications or refusal to use them according to indications, an unstable therapeutic effect, relapses of the disease, and long-term treatment were noted. In order to eliminate the load on the articular surfaces of the TMJ (6, 7), a therapeutic mouthguard was used, followed by orthodontic reconstruction of the dentition. Along with the existing conservative treatment, surgical treatment methods were also used - arthrocentesis with intra-articular lavage and arthroscopy with removal of exostoses on the surface of the articular head (9). Complications were observed after surgical interventions: damage to the facial nerve, hematoma formation, and non-cosmetic scars. In this regard, there is a need to develop new approaches to the treatment of TMJ arthrosis.

Purpose of the study— comparison of the results of complex treatment of deforming arthrosis of the TMJ using transcranial electrical stimulation (TES therapy) with traditional methods of treating this pathology.

MATERIAL AND METHODS

The studies were carried out on 40 patients with deforming arthrosis of the TMJ. The age of the patients ranged from 18 to 75 years. The main group included 20 patients, including 17 (85%) women and 3 (15%) men, who were treated with TES therapy. The comparison group consisted of 20 patients: 18 (90%) women and 2 (10%) men who received traditional treatment using medications and known physiotherapeutic methods of treatment. The control group consisted of 10 practically healthy people without TMJ pathology. An immunological blood test to detect the level of serum cytokines - interleukins (IL)-1p, -6, -10 and β -endorphin was carried out on an ANTHOS analyzer (Austria) using Vector-Best test kits. Venous blood was collected from patients before treatment, on days 3, 6 and 9. TES therapy was performed using the Transair-01 device (St. Petersburg). The first session of TES therapy lasted no more than 30 minutes, at a current strength of 0.5 mA. Subsequent sessions are 40 min. The current strength was increased by 0.3 mA with each session. By the 10th session of TES therapy, the current strength was increased to 3 mA.

RESULTS AND DISCUSSION

After the diagnosis of “deforming arthrosis of the TMJ” was made, a mouthguard was made and fixed, increasing the bite by 2-3 mm, on the upper or lower jaw. The mouth guard was recommended to be worn day and night for 1-2 months. From the very first days after fixing the mouth guard, TES therapy was prescribed for 10-15 sessions. To relieve severe pain, TES therapy was prescribed 2 times a day, morning and evening for a week, bringing the current strength to 3 mA. In addition, the patient was prescribed therapeutic myogymnastics and mechanotherapy until the mouth opened within the physiological norm (40-42 mm). Based on data from clinical, immunological studies and computed tomography, treatment results were monitored.

A study of the concentration of β -endorphin in patients with deforming arthrosis of the TMJ before treatment showed its correspondence to that in practically healthy individuals. Evaluation of this indicator in the dynamics of observations after TES therapy indicated its significant increase on the 6th

and, especially, on the 9th day, while against the background of traditional therapy there was only a slight tendency to increase the level of beta-endorphin in the peripheral blood of patients (see table). An assessment of the concentration of pro-inflammatory cytokines showed that in deforming arthrosis of the TMJ there is a significant increase (10 times) in the concentration of pro-inflammatory IL-6 relative to the average range of age norms, and the level of serum concentration of IL-6 corresponds to the control level. In the dynamics of traditional therapy and TES therapy for the disease, a unidirectional decrease in the concentration of IL-6 was revealed, but it was more pronounced with TES therapy (see table).

Changes in the content of beta-endorphin (in pg/ml) and cytokines (in pg/ml) in patients with deforming arthrosis of the TMJ during TES therapy (M±t, p)

Group	β-endorphin	IL-1	IL-6	IL-10
Before treatment	1.50±0.18	4.24±0.50	40.27±5.12*	3.16±0.42*
TES therapy				
3rd day	1.61±0.20	20.00±1.95*L	26.75±2.11*L	1.93±0.21*L
6th day	1.83±0.14*	12.63±1.38*1	22.44±2.48*L	15.24±1.89*L
9th day	1.97±0.23*	11.00±1.09*L	9.56±1.13*L	6.06±0.96L
Traditional therapy				
3rd day	1.50±0.13	3.11±0.53*L	36.75±4.04*L	1.33±0.19*L
6th day	1.57±0.31	14.53±1.56*L	57.18±6.17*L	1.28±1.01*L
9th day	1.62±0.27	6.32±1.04*L	15.44±1.83*L	1.16±0.43*L
Control	1.51±0.17	5.23±0.65	4.35±0.38	5.69±0.65

Note.* Significant difference from control; 1 significant difference from the value before treatment

On the 9th day after TES therapy, the IL-6 content was 9.56±1.13 pg/ml versus 4.35±0.38 pg/ml in the control, and at the same time after traditional therapy - 15.44 ±1.83 pg/ml. TES therapy normalizes the initially low concentration of anti-inflammatory IL-10 by the 9th day of observation, while with traditional therapy it remains almost 5 times lower than normal at all times thereafter (see table).

Changes in the content of beta-endorphin (in pg/ml) and cytokines (in pg/ml) in patients with deforming arthrosis of the TMJ on background therapy normalizes the initially low concentration of anti-inflammatory IL-10 by the 9th day of observation, while with traditional therapy it remains almost 5 times below the norm at all times after that (see table).

Computed tomography of the TMJ, carried out in 40 patients with deforming arthrosis of the TMJ, showed that TES therapy helps improve the processes of reparative tissue regeneration. When comparing the data obtained, the proposed treatment method showed a significant advantage compared to the used methods for treating TMJ arthrosis.

CONCLUSION

Thus, myogymnastics and mechanotherapy make it possible to restore the degree of mouth opening to the physiological norm. The use of a relaxing, uncoupling mouthguard, which increases the bite by 2-3 mm, creates conditions for diastasis between the articular surfaces of the TMJ and normalization of the position of the articular heads in the articular fossae. TES therapy has immunomodulatory, analgesic, anti-inflammatory effects, and helps improve bone tissue regeneration. The immunotropic effects of TES therapy consist of a decrease in the initially high level of concentration of pro-inflammatory IL-6, an increase in the concentration of anti-inflammatory IL-10, as well as an adequate increase in the concentration of β-endorphin. The proposed method of complex treatment of deforming arthrosis without the use of drugs is more effective compared to known methods of treating this pathology, allowing to reduce the rehabilitation period of patients by 2 times.

LITERATURE

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